



CASE STUDY SUMMARY

Staples installed wireless control technology that allows them to automatically reduce lighting and HVAC loads at 119 of their California stores.

- Participant:
Staples, Inc.
- Building Type:
Retail, multi-site
- Site Size:
2.6 million ft²/
119 stores
- Project Cost:
\$320,000
- Project Incentives:
\$300,000
- Primary Benefit:
2.8 MW curtailable
demand

Enhanced automation allows Staples to shed 2.8 MW across 119 stores from a single location.

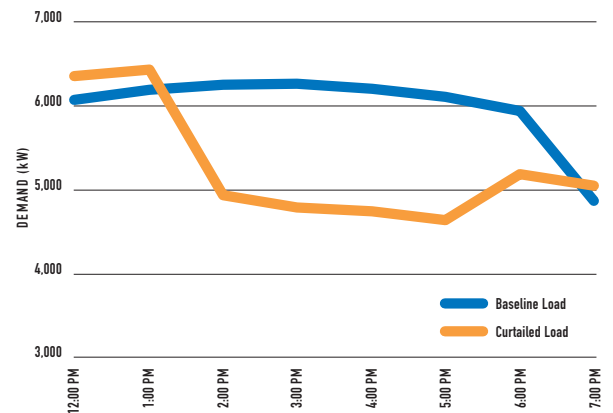
In response to the California electricity crisis, Staples, Inc. investigated ways to insulate their California stores from record-high wholesale electricity rates. With funding from the California Energy Commission and help from Energy Logic, Inc., an energy consulting firm, Staples installed wireless control technology that allows them to automatically reduce the lighting and HVAC loads at most of their California stores. Staples can now curtail up to 2.8 MW of demand within minutes without compromising customer comfort.

- Rising energy costs
- Decentralized loads throughout retail chain
- Unreliable energy supply

PROBLEM

From their headquarters in Massachusetts, executives at Staples, Inc. were watching with increasing concern as the energy crisis unfolded in California during the summer and fall of 2000. Almost one-tenth of Staples' 1,300 office supply superstores were located in the territories of the three California investor-owned utilities, which were paying record-high wholesale electricity prices. In Southern California, the high cost of energy was being passed on to the utility's customers—including Staples. The waves of rolling blackouts that followed in the early months of 2001 did little to assuage Staples' concerns about the future cost and supply of energy in California.

Baseline versus Curtailed Load at 70 Staples Stores



The above graph compares baseline and curtailable energy demand in 70 of Staples' California stores. The curtailed demand was measured on July 3, 2001, when curtailment began at 1:00 p.m. in response to a Stage 2 emergency. The baseline demand was calculated as the average demand over five preceding non-holiday weekdays.

- Automated control of lighting and HVAC loads
- Centralized control of decentralized loads
- Load verification metering system

SOLUTION

Energy Logic, Inc., an energy-consulting firm in Massachusetts, devised and implemented an energy management plan for Staples that would help insulate several California stores from surging demand charges and rolling blackouts. The plan involved the installation of wireless control technology that allows Staples personnel to send electronic pages from the Internet to automatically reduce the lighting and HVAC loads at selected California stores. To verify the load reductions, Staples also installed modem-enabled utility meters at each of the stores. Energy Logic, Inc. secured funding for the project from the California Energy Commission. Action Electric and Novar Controls undertook the electrical and programming aspects of the work, respectively.

With the ability to curtail peak demand from virtually anywhere within a matter of minutes, Staples can insulate themselves from electricity price volatility. In addition, their enhanced automation system puts Staples in a position to take advantage of real-time pricing and demand reduction programs.

- **Energy cost savings**
- **Automated load shedding**
- **Consistency of operation across multiple stores**
- **Ability to participate in incentive programs**

BENEFITS

Staples now has the ability to curtail up to 2.8 MW of demand within minutes without affecting customer comfort. This not only leads to significant savings in demand charges during peak periods, but also strengthens the reliability of regional electricity supplies in the event of a Stage 2 or Stage 3 emergency. The ability to curtail, along with the load-verification metering system, also enables Staples to participate in a California Independent System Operator program that pays incentives for each kW reduced during peak demand times.

Because the system is based on wireless Internet paging technology, the lighting and HVAC equipment at the 119 stores can be controlled from Staples' headquarters in Massachusetts. This centralized remote control helps Staples ensure consistency of operation among its stores, a key criterion for the new system.

Staples' new energy information system allows Staples personnel to access and view 15-minute meter data from a password-protected Web site as soon as the following day. Data is being archived on the site so that Staples can analyze energy use patterns to make further efficiency improvements. By reviewing demand levels, Staples is able to verify that the paging signals are successfully reaching the facilities and controlling the targeted equipment.

PROJECT SITE DESCRIPTION

- **Location:**
Throughout California
- **Size:**
2.6 million ft²
- **Space Function:**
Retail
- **Number of Stores:**
119
- **Contact:**
Bob Valair
Director of Energy and
Environmental Management

Energy Usage

- **Peak Demand:**
12.8 MW
- **Curtable Demand:**
2.8 MW

Equipment Installed

- Pager-activated relays
- Modem-enabled interval meters
- Phone lines

Project Cost

- \$320,000

Project Incentives

- \$300,000



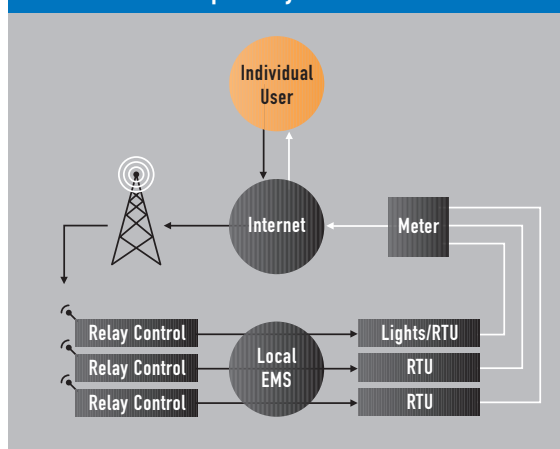
Technical Information

Staples' California locations were already utilizing a Novar energy management system (EMS) with direct digital control over the lighting and HVAC systems. The challenge was creating a load-curtailement strategy that could be activated at all 119 stores within a half an hour and from Massachusetts headquarters. Carolyn Banks of Energy Logic, Staples' energy consultant, first investigated a radio-activated relay system, but discovered that Staples would be unable to purchase the use of radio antennae needed to carry the radio signals. Banks therefore recommended that Staples purchase a paging-activated relay system offered by Cannon to give Staples wireless centralized control via pages that are activated from Web-enabled software. The purchase also allowed Staples to use any of the available paging carriers.

There are two basic components of the Internet paging system: (1) a set of three relays that were installed in each store and wired into the store's EMS and (2) Web-enabled software that allows equipment operation to be scheduled and activated over the Internet. Each of the three relays corresponds to a curtailment level. Level one reduces half of a store's lighting and powers down one rooftop HVAC unit (RTU). Each additional relay powers down one more RTU. The relays can be activated all at once or in stages. The software that initiates the pages is linked to a Web server, so Staples personnel can program the activation of relays through a standard browser from virtually anywhere.

Because Staples wanted to be eligible for participation in a demand reduction program offered by California's Independent System Operator, Staples needed to install a utility-grade interval meter at each of the 119 stores. These meters measure and store energy use in 15-minute increments and are equipped with a telephone modem. Staples can log onto a Web site provided by Datapult, an energy information service provider that collects and archives raw meter data, and view and analyze their energy consumption information in a variety of formats. This system gives Staples next-day access to their metered data.

Schematic of Staples' System



TAKING THE NEXT STEP

Free resources are available from the California Energy Commission.

- Business Case Guidebook
- Technical Options Guidebook
- Contractor and Vendor Lists
- Technical Assistance
- Case Studies

- 1 Alameda County HVAC Controls/ Government Facility
- 2 Hewlett-Packard Company HVAC and Lighting Controls/ Office Campus
- 3 Comerica Building HVAC and Lighting Controls/ Large Office Building
- 4 Foothill-De Anza Community Colleges HVAC and Lighting Controls/ College Campuses
- 6 Doubletree Hotel Sacramento HVAC and Lighting Controls/ Hotel and Convention Center

Contact us for free materials or for further information:

- 1-866-732-5591
- enhancedautomation@xenergy.com
- www.ConsumerEnergyCenter.org/enhancedautomation

Additional Resources

- California Energy Commission
www.energy.ca.gov/peakload/index.html
- Cash for Kilowatts Web site
www.energy.ca.gov/peakload/cash_kilowatts.html
(also for 50-200 kW demand)
- Your local utility
 - www.sdge.com/business/drpf.html
 - www.pge.com/003_save_energy/003b_bus/index.shtml
 - www.sce.com/sc3/002_save_energy/002i_load_redn/default.htm